Braeburn®

MODEL
# 1200

*Builder Series*
*Non-Programmable*
*2 Heat / 1 Cool*
*Heat Pump Thermostat*

# USER MANUAL

***Compatible with low voltage multi-stage heat pump systems with up to two stages of heating and one stage of cooling. Not for use on single-stage heating or cooling systems.***

***READ ALL INSTRUCTIONS BEFORE PROCEEDING***

## WARNING!

***Important Safety Information***

- Always turn off power to the air conditioning or heating system prior to installing, removing, cleaning or servicing thermostat.
- Read this manual thoroughly prior to installing, programming or operating this thermostat.
- This thermostat is designed for use with a 24 Volt-AC low voltage multi-stage heat pump systems.
- Do not use this thermostat on single stage systems or other systems with voltages higher than 30 Volt-AC.
- This thermostat requires 24 Volt AC power for normal operation and control of the heating or cooling system.
- Wiring must conform to all building codes and ordinances as required by local and national code authorities having jurisdiction.
- Do not short (or jumper) across terminals at the heating or cooling system control board to test the thermostat installation. This could damage the thermostat and void the warranty.
- Do not select COOL mode of operation if the outside temperature is below 50˚ F (10˚ C). This could possibly damage the controlled cooling system and may cause personal injury.
- This thermostat should only be used as described in this manual. Any other use is not recommended and will void the warranty.

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## 1 SPECIFICATIONS

- Electrical Rating: 24 Volt AC (18-30 Volt AC)
  1 amp maximum load per terminal
  3 amp total maximum load (all terminals)
- Control Range: 45˚ - 90˚ F (7˚ - 32˚ C)
- Accuracy: +/- 1˚ F (+/- .5˚ C)
- AC Power: 18-30 Volt AC
- Compatibility: Multi-stage heat pump systems with up to two stages of heating and one stage of cooling.
- Terminations: R, C, G, Y, W2, E, O, and B

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# 2 INSTALLATION

## 2.1 Replacing Existing Thermostat

**1.** Always turn off power to the air conditioning or heating system prior to removing existing thermostat.

**2.** Remove the cover of your old thermostat and locate the wire terminals. Do not remove wires from terminals yet.

**3.** Using small pieces of masking tape label wires prior to removal from terminals. Use the chart below to determine the new terminal designations for your new thermostat.

| Old Terminal from Existing Thermostat | New Terminal for New Thermostat | Terminal Description |
|---|---|---|
| R, V-VR or VR-R | R | 24 VAC |
| O | O | Reverse Valve (Cooling) |
| B | B | Reverse Valve (Heating) |
| C, X or B | C | 24 VAC common |
| Y, Y1 or M | Y | 1st Stage Compressor |
| E | E | Emergency Heating |
| G or F | G | Fan Control |
| W1, W2 or W-U | W2 | 2nd Stage / Aux Heating |

**4.** After labeling and removing all wires from terminals, unscrew the existing thermostat sub-base from wall. Make sure to secure wires to prevent them from slipping back into the hole in the wall.

**NOTE:** *This thermostat is for use on low voltage 24 Volt AC multi-stage heat pump systems with up to two stages of heating and one stage of cooling and requires a transformer common wire for proper installation. This thermostat is not for use on single stage heating or cooling systems.*

## 2.2 Installing Your New Thermostat

**NOTE:** *If you are installing this thermostat in a new installation be sure to locate the thermostat 4 to 5 feet above the floor in accordance with applicable building codes. Make sure to install the thermostat in a location that provides good airflow characteristics and avoid areas behind doors, near corners, air vents, direct sunlight or near any heat generating device. Installation in any of these areas could impact thermostat performance.*

**1.** Always turn off power to the air conditioning or heating system prior to installing your new thermostat.

**2.** Place system switch on front of thermostat to **OFF** position.

**3.** Place fan control switch on front of thermostat to **AUTO** position.

**4.** Remove front of thermostat body from sub-base by pressing release latch on bottom of front body.

**5.** Place the thermostat sub-base against wall in the desired thermostat location.

**6.** Guide thermostat wires through center hole in sub-base. Continue to hold sub-base against wall.

**7.** Mark placement of mounting holes as appropriate and drill using a 3/16" drill bit.

**8.** Gently tap supplied plastic anchors into the holes in the wall.

**9.** Place the thermostat sub-base against the wall in the desired location, making sure the mounting holes are aligned as appropriate and the thermostat wires are properly inserting through opening in middle of sub-base.



# 2 INSTALLATION *cont.*

## 2.2 Installing Your New Thermostat *cont.*

**10.** Fasten the sub-base to wall using supplied screws.

**11.** Connect wires to quick wiring terminal block as appropriate using the new terminal designations. Refer to *Wiring Diagram* section of this manual if required for assistance.

**12.** Make sure all of the wire connections are secure and are not touching any other terminal to prevent electrical shorts and potential damage to the thermostat.

**13.** Turn the front thermostat body over, exposing the rear view of the circuit board.

**14.** Locate the interal **°F / °C** switch on the circuit board.

**15.** Using your fingers, gently flip the switch toward the preferred temperature **°F / °C** scale.

**16.** Attach front body of thermostat to sub-base of thermostat, being careful to align the terminal pins on the front body with the terminal block on the sub-base.

**17.** Restore system power so you can test installation.

# 3 TESTING YOUR NEW THERMOSTAT

## WARNING! *Read BEFORE Testing*

- Do not short (or jumper) across terminals at the heating or cooling system control board to test the thermostat installation. This could damage the thermostat and void the warranty.
- Do not select **COOL** mode of operation if the outside temperature is below 50° F (10° C). This could possibly damage the controlled cooling system and may cause personal injury.
- This thermostat includes an automatic compressor protection feature to avoid potential damage to the heat pump system from short cycling. This thermostat automatically provides a 5-minute delay after turning off the heating or cooling heat pump output to protect the compressor.

**NOTE:** *Test your thermostat prior to programming any user settings. Pressing the **RESET** button will erase any user entries previously programmed. This will erase all user settings and return them to their default values.*

**1.** Place the system switch in the **HEAT** position.

**2.** Press the ∧ button on the keypad until the setpoint temperature setting is a minimum of 3 degrees higher than the current room temperature. The heating system should start within several seconds. The fan may not turn on immediately due to the heating system built-in fan delay.

**3.** Place the system switch in the **OFF** position. The heating system should stop within several seconds.

**4.** Wait 5 minutes for the automatic compressor short cycle protection period to expire, or press the **RESET** button to bypass this feature for initial testing purposes. Pressing the **RESET** button will erase any user entries previously programmed.

**5.** Place the system switch in the **COOL** position.

**6.** Press the ∨ button on the keypad until the setpoint temperature is a minimum of 3 degrees lower than the current room temperature.

**7.** The cooling system should start within several seconds. Place the system switch in the **OFF** position. The cooling system should stop within a few seconds.

**8.** Place the fan switch in the **ON** position. The system blower should start.

**9.** Place the fan switch in the **AUTO** position. The system blower should stop.

# 4 PROGRAMMING USER SETTINGS

## 4.1 Default Thermostat Settings

| Function | Status After Reset |
|---|---|
| Operation Mode | Normal Operating Mode |
| Room Temperature | 70˚ F (21.0˚ C), to be renewed within 5 seconds |
| Setpoint Temperature | According to system switch:<br>62˚ F (17.0˚ C) for Heat,<br>Emergency Heat and Off<br>85˚ F (29.0˚ C) for Cool |
| Temperature Scale | ˚F or ˚C dependent on switch setting |
| First Stage Differential | 0.5˚ F (0.25˚ C) |
| Second Stage Differential | 2˚ F (1.0˚ C) |
| Short Cycle Protection Timer | Reset |
| Output Relays | Off |

## 4.2 Setting Temperature Differential

The default settings for the first and second stage differentials and residual cooling fan delay settings are compatible with most systems and applications. This is normally set at time of installation and usually does not require any modification under normal operating conditions. If you feel that the first or second stage of your system is turning on too often, simply follow the instructions below.

**NOTE:** *The first and second stage differential settings are the same for the heating system.*

### 4.2.1 *Setting First Stage Differential*

The default setting is 0.5˚ F (0.25˚ C). The room temperature must change .05˚ F (0.25˚ C) from the setpoint temperature before the thermostat will initiate the system in heating or cooling.

1. In normal operating mode, press and hold the ∧ and ∨ buttons at the same time for 4 seconds. LCD display will show "**SET D1 x˚**", where "**x**" equals the ˚F / ˚C differential setting. This is the current first stage differential setting.
2. Press the ∧ or ∨ buttons to set the first stage differential to your desired setting of .5˚, 1˚, or 2˚ F (.25˚—displayed as .2˚, .5˚, or 1˚ C).

**NOTE:** *If you do not desire to change the second stage differential "**SET D2**" setting you can wait 5 seconds and the thermostat will automatically return to the normal operating mode. Otherwise, you can press the ∧ and ∨ buttons at the same time twice to skip the second stage differential setting.*

### 4.2.2 *Setting Second Stage Differential*

The default setting is 2˚ F (1.0˚ C). This means that the room temperature must change 2˚ F (1.0˚ C) in addition to the first stage differential setting before the thermostat will initiate the second stage of the system in heating.

3. Press the ∧ and ∨ buttons at the same time again and the LCD display will show "**SET D2 x˚**", where "**x**" equals the ˚F / ˚C differential setting. This is the current second stage differential setting.
4. Press the ∧ or ∨ buttons to set the second stage differential to your desired setting of 2˚, 3˚, 4˚, 5˚, or 6˚ F (1.0˚, 1.5˚, 2.0˚, 2.5˚, or 3.0˚ C).



# 4 PROGRAMMING USER SETTINGS *cont.*

**NOTE:** *Once you have finished setting the differentials, wait 5 seconds and the thermostat will return to the normal operating mode.*

**NOTE:** *To erase all user program settings, gently press **RESET** button using a paper clip or a small pencil tip. This will return all thermostat settings to their default values. Remember, this will erase all user program settings entered by the user.*

# 5 ADDITIONAL OPERATION FEATURES

## 5.1 Review Set Temperature

1. Press and hold the ∧ or ∨ buttons. The current setpoint temperature will be displayed in the place of the current room temperature, and the indicator **SET** will be displayed.
2. The display will return to normal operating mode when the ∧ or ∨ button is released. Continuing to hold the ∧ or ∨ button for 3 seconds or longer will allow the user to change the current setpoint temperature (See *Changing Set Temperature*).

## 5.2 Changing Set Temperature

1. Press and hold ∧ or ∨ button for 3 seconds. The entire display will flash once and the **SET** indicator will be flashing. Release the ∧ or ∨ button and press the ∧ or ∨ button again as desired to adjust the set temperature.
2. The display will return to normal operating mode after 5 seconds.
3. The **SET** indicator will turn off indicating that the current temperature shown in the display is the room temperature.

## 5.3 Compressor Protection

This thermostat includes an automatic compressor protection feature to avoid potential damage to the heat pump system from short cycling. This thermostat automatically provides a 5-minute delay after turning off the heating or cooling heat pump output to protect the compressor.

**NOTE:** *The installer can reset the thermostat and bypass the compressor protection features by pressing the **RESET** button. This will erase all user program settings and should only be used during installation for testing purposes or to reset a thermostat to regain normal operation. This will return all thermostat settings to their default values. The user will have to re-program all of the erased settings.*

# 5 ADDITIONAL OPERATION FEATURES *cont.*

### 5.4 Resetting The Thermostat

The Reset feature allows the user to completely reset the thermostat and to register new manual **˚F / ˚C** temperature scale switch settings.

1. To erase all entered program settings, gently press **RESET** button using a paper clip or a small pencil tip.
2. This will return all thermostat settings to their default values and register all new manual **˚F / ˚C** temperature scale switch settings.

### 5.5 Non-Volatile Memory

In the event of a power failure, the Non-Volatile Memory feature of this unit allows all settings to be recovered, eliminating the need to reset temperature and differential settings. When AC power is restored after an outage, all settings are retrieved from memory and reinstated.

# 6 TROUBLESHOOTING

| SYMPTOM | POTENTIAL SOLUTION |
|---|---|
| Thermostat does not turn on heating or cooling system. | Check to see if **OFF** is shown in display. This indicates that the system is turned off at the thermostat. Move the system selector switch to the **HEAT** or **COOL** position. After the compressor short cycle protection 5-minute period expires the system should start within a minutes time.<br>Compressor protection features may be in effect due to compressor short cycle conditions. See *Compressor Protection* section for full explanation of this feature.<br>Heat Pump may be malfunctioning. If heating is required, you can slide the system switch to **EMER** setting, which will start the Emergency Heat source to provide heating until the heat pump can be serviced. |
| Thermostat turns on heating instead of cooling, or cooling instead of heating. | Check thermostat wiring to make sure that the heating and cooling stages are connected to the correct terminals on the wiring terminal block. See *Installation* and *Wiring Diagram* sections of this manual. |
| Thermostat turns heating or cooling system on too often or not often enough. | Increase or decrease first stage temperature differential setting as appropriate to provide the desired performance level. See *Setting Temperature Differential.* |



# 6 TROUBLESHOOTING *cont.*

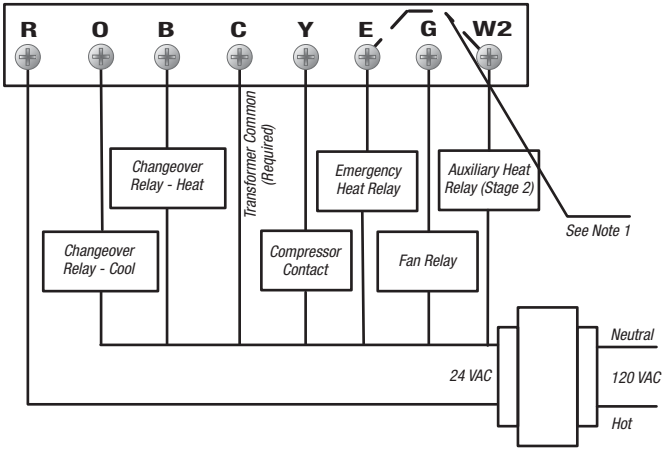
| SYMPTOM | POTENTIAL SOLUTION |
|---|---|
| Thermostat turns on second (auxiliary) stage of heating or cooling too quickly or not quickly enough. | Increase or decrease second (auxiliary) stage temperature differential setting as appropriate to provide the desired performance level. See *Setting Temperature Differential.* |
| **OFF** is shown in thermostat display and heating or cooling system will not start. | This indicates that the system is turned off at the thermostat. Move the system selector switch to the **HEAT** or **COOL** position. After the compressor short cycle protection 5-minute period expires the system should start within several seconds. |
| Thermostat display is blank. | It is possible that AC power is not present at the thermostat. Check fuse, circuit breaker and thermostat wiring as appropriate to verify AC power is available.<br>If AC Power is present, call a professional service technician immediately to verify thermostat and system performance. |
| **HI** is shown in the thermostat display where the room temperature is normally displayed. | The temperature sensed by the thermostat is higher than the 90˚ F (32˚ C) upper limit of the thermostats display range. The display will return to normal after the sensed temperature lowers within the 45˚ to 90˚ F (7˚ to 32˚ C) display range. Turn on the cooling system or use other methods to lower the temperature accordingly.<br>This condition could occur from the system being turned off during an exceptionally warm period or upon installation when the thermostat has been stored for a long period of time in a warm vehicle or location prior to being installed. The thermostat is equipped with a mechanical high temperature safety switch that will turn off the thermostat should the temperature exceed 99˚ F (37˚ C). |
| **LO** is shown in the thermostat display where the room temperature is normally displayed. | The temperature sensed by the thermostat is lower than the 45˚ F (7˚ C) lower limit of the thermostats display range. The display will return to normal after the sensed temperature rises within the 45˚ to 90˚ F (7˚ to 32˚ C) display range. If the temperature in the controlled space seems to be normal, wait for the thermostat to acclimate to the correct room temperature. If the room seems to be colder than usual, turn on the heating system to raise the temperature as needed for comfort within the room.<br>This condition could occur from the system being turned off during a cold weather period or upon installation when the thermostat has been stored for a long period of time in a cold vehicle or location prior to being installed. The thermostat should be allowed to warm up prior to installation to allow proper heating control once installed. |

## 6 TROUBLESHOOTING *cont.*

| SYMPTOM | POTENTIAL SOLUTION |
|---|---|
| Thermostat will not allow me to program a setpoint temperature higher than 90˚ F (32˚ C). | This is above the normal thermostat temperature setting range of 45˚ to 90˚ F (7˚ to 32˚ C). |
| Thermostat will not allow me to program a setpoint temperature lower than 45˚ F (7˚ C). | This is below the normal thermostat temperature setting range of 45˚ to 90˚ F (7˚ to 32˚ C). |
| Fan continues to run all the time whether the system is on or off. | Check that the fan control switch is in the **AUTO** position. This will allow the fan to run only when the heating or cooling system is turned on and running.<br>Check thermostat wiring to make sure that the fan control wiring is connected to the correct terminals on the wiring terminal block. See *Installation* and *Wiring Diagram* sections of this manual. |
| The room is too warm or too cold. | See *Review Set Temperature* section of this manual to verify the current setpoint and make any modifications that are necessary. |

## 7 WIRING DIAGRAM

**Wiring Diagram for 2 Stage Heat, 1 Stage Cool**




***NOTE:*** *1. Jumper is required to use Auxiliary Heat for both Second Stage and Emergency Heat on units without separate Emergency Heat and Auxiliary Heat terminals.*
*2. Make O / B connections as required by unit.*

***Store this booklet for future reference***

Braeburn Systems LLC warrants each new Braeburn thermostat against any defects that are due to faulty material or workmanship for a period of five years after the original date of purchase by a professional service technician. This warranty and our liability does not apply to batteries, nor does it include damage to merchandise or the thermostat resulting from accident, alteration, neglect, misuse, improper installation or any other failure to follow Braeburn installation and operating instructions.

Braeburn Systems LLC agrees to repair or replace at its option any Braeburn thermostat under warranty provided it is returned postage prepaid to our warranty facility in a padded carton within the warranty period, with proof of the original date of purchase and a brief description of the malfunction. This limited warranty does not include the cost of removal or re-installation.

This warranty gives you specific legal rights and you may also have other rights that vary from state to state or province to province. Answers to any questions regarding our limited warranty may be obtained by writing our corporate offices.

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